RIVERS AND FLOODS, MAY, 1919.

ALFRED J. HENRY, Meteorologist in Charge.

Atlantic drainage.—Moderately heavy and long-continued showery weather over New York and northern Pennsylvania during the last decade of the month caused the small streams, particularly in western and southern New York, to overflow, thereby damaging highways and the roadbed of the railroads in that part of the State. Heavy rain was not general over a large area and therefore the floods were largely local.

South Atlantic drainage.—General and heavy rains over the Atlantic drainage of the southern Appalachians on May 6, 7, 8, 13, and 14 caused two distinct flood waves in the streams of that region, neither of which was particularly destructive.

Gulf drainage.—Only local flood stages occurred and there was not much damage.

Great Lakes drainage.—In the first decade of the month a general rainstorm passed northeastward across lower Michigan. The rivers of that section and also of northern Indiana, including the Wabash, reached flood stages locally without serious damage.

Mississippi drainage (Mississippi proper).—As noted on the April, 1919, REVIEW, the Mississippi was in flood at the close of the month in that stretch of the stream between Keokuk, Iowa, and Louisiana, Mo. Moderately heavy rains fell over northeastern Missouri, southeastern Iowa, and western Illinois on the 2d, 3d, and 4th. These rains while not particularly heavy came at the time when the river was at a high stage. As a result, the river rose to the highest stages of the year, and the highest since 1903 between Quincy, Ill., and Louisiana, Mo. Warnings were issued by the Weather Bureau on May 3 and repeated with amplification on May 5, 6, and 7. Immediately protective measures were taken to guard against a failure of the levees protecting the farm lands back of them. The weak spots in the 52 miles of levee in the Hannibal, Mo., district were at once reinforced and a day and night patrol was established. This patrol was continued until the 14th when the stage of the river had passed below 16 feet on the Quincy, Ill., gage. The only serious flooding which occurred was due to an incompleted levee near Louisiana, Mo. About 7,000 acres of land in that section were flooded. The lower river was not in flood during the month except locally at Arkansas City, Ark.

The Rio Grande.—Melting snows in sheltered places in the Rocky Mountains was responsible for high water in the Rio Grande in New Mexico from the 6th to the 10th and again from the 24th to the 27th.

Pacific coast drainage.—Due to the temperatures in the higher regions of the Middle Rocky Mountains the flow of the Colorado was less than usual.

The Columbia passed above flood stage at Marcus, Wash., on the 26th and at Vancouver on the same date. The flood at the last-named came out of the Willamette.

Estimated loss by flood, May, 1919.

District.	Bridges, highways, and railroads.	Crops and gardens (prospective).	Farm property, fences, live stock, etc.	Suspension of business.	Value of warning.
Middle Atlantic	$50,000	$20,000	$1,000	$10,000	
South Atlantic	2,500	4,000	1,190	1,963	$91,000
Hannibal, Mo.	8,500	140,000	500		75,000
Little Rock, Ark.		10,000			
Total	61,000	174,000	2,690	11,963	166,000

TABLE I.—*Flood stages in the Atlantic drainage for the month of May 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Connecticut:	*Feet.*			*Feet.*	
Hartford, Conn.	16	23	26	19.1	24
White River Junction, Vt.	13	23	23	13.3	23
Santee:					
Rimini, S. C.	12	4	4	12.0	4
Do.	12	8	29	16.4	19
Ferguson, S. C.	12	9	26	13.8	20
Do.[1]	12	29	31	12.5	29
Catawba:					
Catawba, S. C.	11	14	15	12.5	14
Wateree:					
Camden, S. C.	24	9	10	27.7	9
Do.	24	15	16	28.1	15
Broad:					
Blairs, S. C.	15	14	15	17.5	15
Saluda:					
Pelzer, S. C.	7	13	13	7.8	13
Chappell, S. C.	14	15	16	16.6	15

[1] Continued into June.

TABLE II.—*Flood stages in the East Gulf drainage for the month of May, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Tombigbee:	*Feet.*			*Feet.*	
Demopolis, Ala.	30	31	31	30.0	31

TABLE III.—*Flood stages in the Great Lakes drainage for the month of May, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Maumee:	*Feet.*			*Feet.*	
Fort Wayne, Ind.	15	5	7	19.0	6
St. Joseph:					
Montpelier, Ohio	10	5	8	12.6	6
Tittabawassee:					
Midland, Mich.	12	5	5	12.9	5
Grand:					
Eaton Rapids, Mich.	5	5	7	5.2	6
Grand Ledge, Mich.	6.5	6	6	6.8	6
Grand Rapids, Mich.	11	7	9	12.6	7
East Lansing, Mich.	8	4	7	9.1	6
Cedar:					
Williamton, Mich.	10	5	6	10.1	5

TABLE IV.—*Flood stages in the Mississippi (Ohio basin) drainage for the month of May, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Shenango:	*Feet.*			*Feet.*	
Sharon, Pa.	9	10	12	12.5	10
Tuscarawas:					
Norris Point, Ohio	8	11	12	10.8	12
Scioto:					
Circleville, Ohio	7	10	11	7.8	11
Green:					
Lock No. 6, Brownsville, Ky.	30	11	12	33.3	11
Lock No. 4, Woodbury, Ky.	33	10	15	42.95	12
Lock No. 2, Ramsey, Ky.	34	14	20	36.9	14
Wabash:					
Lafayette, Ind.	11	5	8	17.2	6
Mount Carmel, Ill.	15	12	15	16.2	13
North Fork of Holston:					
Mendota, Va.	8	10	10	8.1	10

TABLE IV.—*Flood stages in the Mississippi (Ohio basin) drainage for the month of May, 1919*—Continued.

MISSISSIPPI AND TRIBUTARIES EXCEPT THE OHIO.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Mississippi:	*Feet.*			*Feet.*	
Keokuk, Iowa	14	1	1	14.3	1
Do	14	4	12	17.4	8
Warsaw, Ill	17	1	1	17.2	1
Do	17	4	12	20.4	8
Des Moines:					
Ottumwa, Iowa	10	4	8	14.2	7
Mississippi:					
Quincy, Ill	14	1	15	19.7	8
Hannibal, Mo	13	1	17	20.1	8
Louisiana, Mo	12	1	16	17.8	9
Grafton, Ill	18	1	3	18.7	1
Do	18	7	17	21.4	11–12
Alton, Ill	21	8	16	24.1	11
Arkansas City, Ark	42	21	[1] 31	44.1	29–30
Illinois:					
Morris, Ill	13	4	10	15.5	6
Peru, Ill	14	4	27	19.0	8
Henry, Ill.[1]	7	1	31	13.3	10–11
Peoria, Ill	16	5	28	19.9	11–12
Havana, Ill.[1]	14	7	31	16.1	12–16
Beardstown, Ill.[1]	12	1	31	16.5	16
Pearl, Ill	12	1	30	15.7	13
Grand:					
Chillicothe, Mo	18	4	11	29.0	6
Brunswick, Mo	10	6	12	15.3	8
Osage:					
Warsaw, Mo	22	18	18	23.2	18
Do	22	20	20	22.0	20
Yazoo:					
Yazoo City, Miss	25	1	9	27.4	1
Smokey Hill:					
Lindsborg, Kans	19	6	6	19.0	6
Do	19	16	16	20.0	16
Do	19	19	19	20.0	19
Neasho:					
Oswego, Kans	17	21	21	18.2	21

[1] Continued into June.

TABLE V.—*Flood stages in the West Gulf drainage for the month of May, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Trinity:	*Feet.*			*Feet.*	
Dallas, Tex	25	18	18	25.1	18
Do	25	27	29	28.8	28
Guadalupe:					
Victoria, Tex	16	11	12	18.0	11
Do	16	15	15	16.8	15
Do	16	27	29	20.8	28

TABLE VI.—*Flood stages in the Pacific drainage for the month of May, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Kings:	*Feet.*			*Feet.*	
Piedra, Cal	12	29	29	12.0	29

TABLE VII.—*Flood stages in the Pacific (Eel River basin) drainage for the month of May, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Columbia:	*Feet.*			*Feet.*	
Marcus, Wash.[1]	24	26	31	27.2	31
Vancouver, Wash.[1]	15	26	31	18.7	31
Kootenai:					
Bonners Ferry, Idaho[1]	26	26	31	28.7	30
Willamette:					
Portland, Oreg.[1]	15	26	31	18.1	31

[1] Continued into June.

MEAN LAKE LEVELS DURING MAY, 1919.

BY UNITED STATES LAKE SURVEY.

[Dated: Detroit, Mich., June 4, 1919.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.*			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during May, 1919:	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Above mean sea level at New York	602.25	581.38	573.69	247.27
Above or below—				
Mean stage of April, 1919	+0.23	+0.36	+0.64	+0.84
Mean stage of May	+0.57	−0.28	+1.52	+0.14
Average stage for May, last 10 years	+0.35	+0.86	+1.04	+0.59
Highest recorded May stage	−0.80	−2.14	−0.73	−1.68
Lowest recorded May stage	+1.43	+1.82	−2.38	+2.31
Average relation of the May level to—				
April level	.....	+0.3	+0.4	+0.3
June level	.....	−0.3	−0.2	−0.2

* Lake St. Clair's level: In May, 576.38 feet.

EFFECT OF WEATHER ON CROPS, MAY, 1919.

By J. WARREN SMITH, Meteorologist in Charge.

Farm work.—Frequent rains and resulting wet soil during most of the month from the central Plains States eastward were unfavorable for farm work, and plowing and planting were much retarded, while like conditions combined with wet soil at the beginning of the month delayed work in portions of the South, particularly in the western Gulf districts. In other sections of the country the month was generally favorable for outdoor operations, and farm work progressed satisfactorily, especially in the more western States.

Winter grains.—The month was generally favorable for the development of winter grains, and these crops made good to excellent progress in practically all of the principal producing sections. In some of the less important areas, however, the latter part of the month was unfavorable, particularly in the central and northern Rocky Mountain districts and in Montana, where dry weather and high temperatures produced harmful results. The growth of winter wheat was rank, and there were some complaints of lodging in the southern Great Plains area and in some central valley States.

Spring crops.—Spring grains made satisfactory progress in most sections during the month under the influence of favorable weather, although the seeding of oats was much delayed in some northeastern sections on account of continued wet soil.

It was too cool and wet for corn in much of the principal corn belt; planting was delayed and germination hindered in many sections. It was more favorable for this crop in most of the South, however, and satisfactory advance was made.

It was also too cool and wet for cotton, and that crop made unsatisfactory advancement, except for fairly good progress in some of the more eastern portions of the belt. It was especially unfavorable for cotton west of the Mississippi River.

Truck crops.—The cool, cloudy weather, with frequent rains, during much of the month in most central and northern districts produced conditions unfavorable for planting and growth of truck crops, but these made better progress in the more southern States, particularly in the southeast. Potatoes and other cool weather crops made generally good advance, however, where the soil was not too wet.